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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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37
EXAMINER

CREPEAU, JONATHAN

ART UNIT

PAPER NUMBER

1746

DATE MAILED: 06/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/042,681

Applicant(s)

ISHIDA ET AL.

Examiner

Jonathan S. Crepeau

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 April 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-25, 33 and 36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-25, 33 and 36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 36 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 14, 2003 has been entered.

This Office action addresses claims 16-25, 33, and 36. The claims are newly rejected under 35 USC §103, as necessitated by amendment.

Claim Rejections - 35 USC § 103

2. Claims 16-18, 22-25, 33 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 8-321301 in view of Nagasubramanian et al (U.S. Patent 5,599,355).

Regarding claims 16 and 22, JP '301 is directed to a lithium secondary battery (see abstract). Regarding claims 22 and 25, the positive electrode comprises a lithium transition metal oxide such as LiCoO_2 which would be positive during discharging of the battery (see paragraph 11 of the translation). Regarding claim 22, the battery contains a microporous polymer film separator and a nonaqueous solution dissolving a lithium salt (see paragraph 18). Regarding claim 16, the electrolyte may also be a gel polymer electrolyte (see paragraph 12).

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Regarding claims 16 and 22, the negative electrode contains graphite, which would be negative during discharging of the battery (see paragraph 16). Regarding claims 16 and 22, the negative electrode further comprises ceramic particles not relating to charge or discharge of the battery (see paragraphs 6 and 7). Regarding claims 17, 18, 23, and 24, the ceramic material comprises Al_2O_3 (see paragraphs 7 and 16). Regarding claims 16, 22, 33, and 36, the content of the alumina is 10 parts by weight in 95 parts by weight of graphite (i.e., 10.5 parts in 100 parts), and the average particle size of the alumina is 3 microns (see paragraph 16). Thus, the range of 5-20 weight parts in 100 weight parts recited in claims 16 and 22 is anticipated. Regarding claim 16, the electrolyte does not comprise the alumina particles (see paragraphs 12 and 13). Regarding claims 33 and 36, Table 1 shows that batteries having 0.05, 1, 10, 20, and 30 weight parts (in 95 weight parts of active material) each have 95% capacity retention.

JP '301 does not expressly teach that the particle size of the alumina is 1 micron or less, as recited in claims 16 and 22, or that the ceramic particles are present in a ratio of between 5 and 10 parts by weight (in 100 parts of active material), as recited in claims 33 and 36.

The patent of Nagasubramanian et al. is directed to composite solid electrolytes containing alumina particles (see abstract). In column 6, line 12, the reference teaches alumina particle sizes of 0.05 and 0.3 microns. In column 7, line 36, the reference teaches that "[b]oth the transport number and ionic conductivity are influenced by the particle size of alumina."

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the

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disclosure of Nagasubramanian et al. to use a particle size of 0.05 microns in the alumina of the JP '301 reference. In column 6, line 22, Nagasubramanian et al. teach the following:

However, the CSE films with 0.05 micron Al_2O_3 (FIG. 1A) exhibits almost resistor like behavior where the contribution from the charge transfer and diffusional processes are insignificant. The a-c characteristics of the CSE films with 0.3 micron Al_2O_3 is typical of systems where the transport number of the reversible ion is very low.

This disclosure would motivate the artisan to use a particle size of 0.05 microns in the alumina of JP '301 so as to result in a high lithium ion transport number. Further, Nagasubramanian et al. indicate that the particle size is a result effective variable that affects ion conductivity in addition to the transport number (see col. 7, line 35). It has been held that the discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980).

Additionally, Applicant's claimed particle content range of between 5 and 10 parts in 100 parts of active material in claims 33 and 36 would be rendered obvious by the disclosure of the Japanese reference. As noted above, the inclusion of 0.05, 1, 10, 20, and 30 weight parts of ceramic particles in 95 weight parts yields acceptable capacity retention ratios ($\geq 95\%$). Therefore, although a value of between 5 and 10 weight parts in 100 weight parts is not expressly disclosed by the reference, the artisan would have a reasonable expectation of success of using a value within this range, and therefore would have sufficient motivation to use such a value. Further, such batteries containing a large amount of particles are identified by the inventors of the JP '301 reference as being part of the invention (i.e., by their inclusion into battery group A1-

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A10; see Table 1 and paragraph 26). Therefore, the claimed range of 5-10 weight parts in 100 parts is not considered to distinguish over the reference.

3. Claims 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 8-321301 in view of Nagasubramanian et al. as applied to claims 16-18, 22-25, 33 and 36 above, in further view of Andrei et al (U.S. Patent 5,756,231).

JP '301 does not expressly teach that one of the positive and negative electrode comprises the polymer electrolyte.

The patent of Andrei et al. is directed to composite cathodes (i.e., positive electrodes) comprising polymer electrolytes for lithium batteries (see abstract). The active cathode material comprises a lithium transition metal oxide (see col. 4, line 67).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the disclosure of Andrei et al. would provide sufficient motivation to use a composite cathode comprising a polymer electrolyte in the battery of the Japanese reference. In column 3, line 60 et seq., Andrei et al. teach that their battery has a "particularly high effective capacitance" and that the active cathode particles advantageously "do not tend to aggregate." Accordingly, the artisan would be sufficiently motivated to use the composite cathode comprising a polymer electrolyte in the battery of the Japanese reference.

Response to Arguments

4. Applicant's arguments filed February 3, 2003 have been fully considered but they are not persuasive. Applicants assert that "[a]n artisan of ordinary skill seeking to improve negative-electrode capacity per unit volume would not dismiss the teaching in paragraph 0008 that more than 1 part by weight of additive powder would cause negative-electrode capacity per unit volume to fall because cells in which the negative electrode contained 0.05 to 30 parts by weight of additive powder had capacity maintenance factors of 95% or higher." The thrust of Applicant's argument appears to be that JP '301 teaches away from using more than 1 weight part of ceramic, and therefore the claimed range of 5-20 weight parts distinguishes over the reference. However, it is the Examiner's position that, when viewing the disclosure of JP '301 as a whole, the artisan would conclude that having the particle content between 0.01 weight part and 1 weight part is merely a preferred embodiment of the invention. As stated above, Table 1 discloses that batteries A4, A5, and A6 each contain more than 1 weight part of ceramic. In paragraph 26, the reference states "the batteries A1-A10 of the present invention." Paragraph 18 further discloses "batteries A1-A6 of the present invention." Therefore, this disclosure fairly suggests that content values from 0.01 to 30 weight parts (batteries A1-A10) are part of the invention of JP '301. Further, as shown in the Table, content values between 0.05-30 weight parts all advantageously produce batteries having 95% capacity retention or better. Therefore, in this context, the disclosure in paragraph 8 that more than 1 weight part leads to other undesirable effects would merely be construed by an artisan as a preferred embodiment of the invention and not as a "teaching away" from using more than 1 weight part. Accordingly, the claimed range of

5-20 weight parts in 100 weight parts is still believed to be fairly disclosed by the JP '301 reference.

Conclusion

5. The following notes are made with respect to the references cited in the International Search Report which bear an "X" label:

WO 94/24715 does not anticipate the claims because it does not teach at least the features of a microporous polymer film separator (claim 22) or that the gel polymer electrolyte does not comprise ceramic particles (claim 16).

EP 379372 and EP 284104 do not anticipate the claims because they do not teach at least the feature of an organic (nonaqueous) electrolyte solution.

JP 4-206168 and WO 97/01870 do not anticipate the claims because they do not teach at least the feature of 5-20 weight parts of ceramic substance per 100 weight parts of active substance.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (703) 305-0051. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached at (703) 308-4333. The phone number for the organization where this application or proceeding is assigned is (703) 305-5900. Additionally, documents may be faxed to (703) 305-5408 or (703) 305-5433.

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Any inquiry of general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

JSC

June 20, 2003


Jonathan Crepeau
Patent Examiner
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